CROP TALK

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End of Season Weed Scouting

by Gilles Quesnel, Field Crop Integrated Pest Management Specialist, OMAFRA

Before the snow flies, fields which will be no-tilled planted next year should be checked for the presence of over-wintering weeds. A quick scouting this fall will identify existing winter annual weeds such as chickweed, biennials such as wild carrot and stubborn perennial weeds such as dandelions. To effectively determine the extent of over-wintering weed pressure, individual fields will need to be scouted and weeds species density recorded.

Recording and/or mapping over-wintering weed species in late fall, including density and location will help you evaluate your weed management from one year to the next. The information will also help you plan next year's weed control program, providing you with a heads-up on the possible need for a preplant burndown application.

Winter wheat fields should also be checked for the presence of over-wintering weeds prior to snow cover. Pay particular attention to no-till winter wheat fields which did not receive a preplant burndown herbicide application this fall. These fields are at risk of infestation with winter annuals (chickweed), biennials (wild carrot) and seedling perennial weeds such as dandelions. Most over-wintering weeds start off early in the spring and are extremely competitive in the first part of the growing season. Even a moderate infestation of dandelion can have a significant negative impact on winter wheat yields if not controlled very early in the season. Scouting wheat fields this fall for the presence of over-wintering weeds will provide lead time to plan next spring's weed control program.

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Ministry of Agriculture, Food and Rural Affairs
Ontario

What Did We Learn In 2007 About Fungicides on Spring Wheat?

by Scott Banks, OMAFRA

Proline® 480 is a relatively new fungicide registered for disease suppression on wheat, barley, canola and several other crops. For wheat and barley, Proline is registered for leaf disease and Fusarium Head Blight (FHB) suppression. Leaf disease suppression can give some yield increase when there is leaf disease pressure present on the plants. Folicur® 432 F is another fungicide which has been used in Ontario for the past few years.

2007 was the first year of a three year project in eastern Ontario designed to look at the impact of Proline versus Folicur on grain yield and visible fusarium and vomitoxin levels in the grain sample. Several spring wheat growers collected data from on-farm, side-by-side strip plots.

Yield Response

The average yield response across all sites in 2007 for Folicur vs no fungicide was 3.86 bushels per acre (bu/ac). For Proline the yield response was about 4.5 bu/ac as compared to no fungicide. The Average yield response shown in in Table 1 - Yields in 2007 Fungicide on Spring Wheat Side-by-Side Strip Plots includes only the head-to-head comparisons where both Folicur and Proline were used.

Table 1 Yields in 2007 Fungicide on Spring Wheat Side-by-Side Plots

Co-operator	Untreated (bu/ac)	With Folicur (bu/ac)	With Proline (bu/ac)
1	70.81	+5.08	+3.79
2	70.81	+2.83	+2.71
3	49.28	+0.50	+14.43
4	49.57	-2.02	+7.77
5	71.55	+13.89	+4.66
6	66.08	+2.51	+3.40
7	69.66	-3.62	-0.18
8	64.96	+3.10	+2.28
9	66.33	+0.43	+0.43
10	60.70	+13.30	n/a
11	48.90	+7.50	n/a
12	61.81	+3.60	+4.95
13	73.80	+2.30	+4.80
14	80.30	+4.60	n/a
	Average	**+2.60[1]**	**+4.46[1]**

[1]The Average includes only the head-to-head comparisons where both Folicur and Proline were used.

Visible Fusarium and Toxin Levels

FHB pressure was generally not a problem in 2007. Given this, most of the grain sample comparisons between treated and untreated showed little or no reduction in the visible FHB. However the toxin levels analyses of the grain samples showed that Proline gave a greater reduction than the Folicur. In this trial, Folicur reduced the toxin levels by about 11% as compared to no fungicide. (past results have shown about a one-third reduction in toxin levels with the use of Folicur.) Proline reduced the toxin levels by about 45% as compared to no fungicide. These results indicate that in years with greater FHB pressure and more risk of higher toxin levels, Proline has an increased chance of reducing the toxin levels and improving the grain grade.

Fungicide Costs

The retail product and application costs for Folicur are about $24 per acre and the cost for Proline is about $35 per acre. With most 90 foot boom sprayer, trampling is about 2.6%, which on a 65 bu/ac crop would equal about 1.7 bu/ac. At $7.00 per bushel spring wheat, the trampling costs add close to $12 per acre. Trampling loss can be significantly reduced with the use of tramlines or in the case of Folicur if it is aerial applied.

Acknowledgements

Thank you to the growers who set up the strip plots and collected the data and the Ottawa Valley Seed Growers for their support of this project.

Aphanomyces Root Rot In Alfalfa

by Joel Bagg, Forage Specialist, OMAFRA, Lindsay

Aphanomyces root rot is caused by the fungus-like pathogen *Aphanomyces euteiches*. Similar to phytophthora root rot (*Phytophthora medicaginis*), it is considered a major cause of disease in alfalfa seedlings, particularly in wet soil conditions. Aphanomyces also attacks adult alfalfa plants and can dramatically reduce yield and vigour of established stands. Aphanomyces is confirmed in a widespread area in the mid-west and northeast United States, and is likely underestimated as an alfalfa pathogen in Ontario.

Seedlings

Aphanomyces is a water mould which requires saturated soil conditions for infection. The organism can survive in the soil for long periods.

Infected seedlings are typically stunted but remain upright. Cotyledons are yellow or purplish, followed by chlorosis of other leaflets. Root systems will initially be tan coloured and then turn dark brown. Affected seedlings are frequently mixed with taller, healthy seedlings. Aphanomyces symptoms in new seedings are usually not apparent when soils are dry after seeding.

Established Stands

Classic symptoms in established stands are stunted, yellow plants. Look for the absence of the fine, fibrous roots. Lateral roots are often rotted and even absent. Established stands that survive the initial infection are typically thin, yellow and weedy, and show reduced rhizobia nodulation. Symptoms appear similar to nitrogen deficiency. Regrowth is slow with poor vigour, and therefore yields are low. Because of the stunted root system, infected alfalfa stands do very poorly during seasons with extended dry weather.

More Chronic Than Phytophthora

Phytophthora tends to kill seedlings more quickly and extensively than aphanomyces, by attacking the tap root. However, aphanomyces is considered more chronic. Aphanomyces is less likely to cause seedling death, but more likely to result in stunted, low yielding alfalfa crops. Fungicides containing metalaxyl (ie Apron) are active against phytophthora, but not aphanomyces. If a grower has used Apron treated seed of an aphanomyces susceptible variety, but has a seedling problem, aphanomyces infection could be the cause.

How Extensive Is It?

There are many alfalfa fields in Ontario that show visual symptoms of aphanomyces, although this has not been confirmed by laboratory analysis. A limited 1992 survey in southwestern Ontario indicated infection in 6 (in 5 different counties.) of 83 alfalfa fields surveyed (7%). Soil tests for aphanomyces are available in the US, but not yet in Ontario. Based on the rapid spread of aphanomyces in neighbouring States in the past decade or so, it seems very possible that it is also a significant alfalfa disease in Ontario.

Resistant Varieties

Aphanomyces is managed by using resistant varieties, similar to what has been done with phytophthora root rot resistant alfalfa varieties. Race 1 and race 2 isolates of aphanomyces have been identified. Race 2 is more virulent. Many alfalfa varieties are resistant to race 1, but far fewer are resistant to race 2. Seed companies are working to make both race 1 and 2 resistant varieties commercially available in Ontario.

Figure 1 - Aphanomyces root rot of alfalfa seedling. (Photo courtesy of APS Press).

Figure 2 – Aphomyces symptoms of root rot (right) and healthy plants (left). (Photo courtesy of APS Press).

Grubs In Pasture and Hay Fields

by Tracey Baute, Field Crop Entomologist, OMAFRA, Ridgetown

Over the last three or four years, more reports are coming in of stand loss due to grubs in pasture and hay fields (Figure 1). During dry years their impact can be exaggerated as the crop struggles to deal with two major stresses at once. Stand loss can also result in poor overwintering of the crop, and an increase in weed establishment. Although there are limited options for management

Figure 1. Extreme grub damage in hay field in Eastern Ontario. Photo credit: Chad Garrod, O'Neill's Farm Supply.

of grubs, knowing if grubs are present and which ones are feeding on your crop can help manage their impact.

Which Type of Grub?

Knowing which grub is feeding on your crop can sometimes help determine when they will be causing the most injury and whether they are going to be a problem for several years to come. Fall is a great time to sample for grubs, as long as you do it before the ground starts to freeze. After that, the grubs move deeper in the ground and wait until spring to feed again.

Take a shovel and pail or plastic container to the problem areas. Grub activity is usually higher in sandy areas and on knolls, particularly on the south facing slopes. Dig a soil sample 1 foot by 1 foot by 6 inches (25 cm X 25 cm X 12 cm) and place it in the container. Sift through the soil with your hands, breaking up any clumps. Count how many grubs are found in each sample. Take a look at their raster patterns to determine what type of grub they are.

European Chafer - 1 Year Life Cycle

European chafer have a one-year life cycle. Adults lay their eggs in moist soil during June and July. The larvae hatch from these eggs and begin feeding late-July or early-August until the ground freezes. The larvae then move deeper into the ground, coming back up in the spring to feed again, until they start to pupate in May. Like all grubs, they are white and C-shaped, with an orange-brown head. To distinguish them from other grubs, you will need to look at their posterior end and determine the pattern of rasters (anal hairs). European chafer have a "Y"- shaped pattern compared to other grubs (Figure 2).

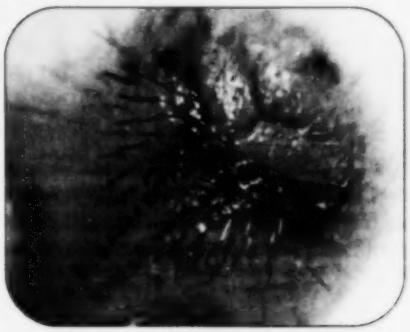

Figure 2. European chafer Y shaped raster pattern on posterior end of the larva.

June Beetles - 3 Year Life Cycle

June Beetles have a three-year life cycle, so are more damaging and more difficult to manage. The start of year 1 is spent as an adult, which does not feed on the crop. The adult emerges from the soil in May to mate and lay eggs in the soil in June. These eggs hatch and the small larvae begin to feed until late-fall. June Beetle grubs do tend to be less tolerate to cold soil temperatures than European chafer, and may move down deeper in the soil earlier than chafers. These June beetle larvae then continue as larvae throughout the entire second year of their cycle, capable of feeding throughout the year, and increasing in size to reach their final instar before overwintering. The third and final year of their cycle starts as a full grown 3rd instar larvae, which feed until about mid-June or early-July, when they finally pupate and become adult. Adults remain in the soil to overwinter and begin the life cycle again the following spring. Their rasters are in an oval shaped pattern (Figure 3).

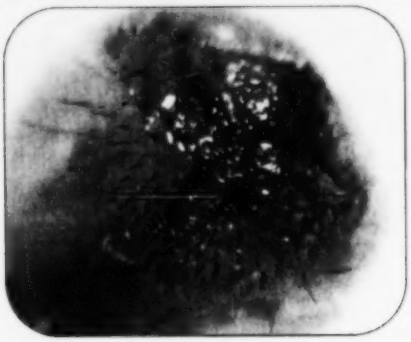

Figure 3. June beetle oval shaped raster pattern on posterior end of the larva.

No Chemical Control Options
Although there is no economic threshold for grubs established yet for pasture, 1 to 2 grubs per square foot most likely indicate a concern. Unfortunately, no chemical control options are registered. Although some products have been proven to work in turf, most potential foliar options have been shown not to be effective in field situations. The best method of managing a grub problem is through cultural methods, as well as good pasture and hay management.

Control Options
Well managed pasture with a good mixture of legume and grass species may help to reduce stand loss, as grubs tend to feed more on the grass species. Overseeding or reseeding may be required for a few years to compensate for what the grubs have taken out.

Plowing may be necessary (where possible) to try to reduce heavier populations of grubs. It may be necessary to rotate out of the susceptible forage crop into another field crop (such as corn or soybeans) where insecticide seed treatments are available to help reduce the grub population. There are no seed treatments registered for grub control in cereals.

Although there are some natural enemies of grubs, they tend not to dramatically reduce populations.. A bacterial disease (*Bacillus popilliae*) known as the "milky disease" can infect grubs, particularly in lawns during wet years. There are also some predators, including ground beetle larvae, that can help but have not shown reduction of these pests in field crops.

For more information on grubs, refer to the OMAFRA Publication 811, *Agronomy Guide for Field Crops*, and the CropPest newsletter on the OMAFRA website at: www.omafra.gov.on.ca.

Manure - Curse or Resource? Depends on the Fall Conditions!

by Chris Brown, Nutrient Management Field Crop Lead, OMAFRA, Woodstock

What a difference a year can make! At the beginning of November 2006, there had been very few opportunities for fall manure application, and options that followed best management practices were limited. Wet, saturated soils combined with late harvest and full manure storages resulted in surface application, sometimes to fields not targeted for manure. Compaction was the consequence and manure seemed to be a curse.

In contrast, as of early November 2007, many are finished harvest. Fall manure application is nearly completed, with close to immediate incorporation and to soils at ideal moisture levels. After a dry growing season where regular previous manure applications have increased soil organic matter, soil moisture holding capacity and increased crop yields, manure seems to be a more valuable resource.

With time on our side, the following are a few reminder tips for maximizing the long term value that manure can provide to the field.

1. The ideal option is still to surface apply manure onto crop residue followed by **incorporation** of the manure as soon as possible after application. The time interval will depend on soil moisture levels, volume of manure applied, and weather (drying) conditions at time of application.
2. Be aware of **application rates**, especially in rolling fields or fields nearby to watercourses. A relatively low rate of 5,600 Imperial gallons (6,800 US gal) is equivalent to ¼ inch (6 mm) evenly applied across the spread width. Consider the slope and soil conditions at the time of application. If a quarter inch of rain fell in one minute, where could the manure move or runoff to?
3. Remember to take a **manure sample for analysis**. With increasing fertilizer prices, the potential reduction in inputs will be appreciated

next spring. The best time to take a sample is during application. The sample should represent what went to the field, so it should include several sub samples taken at various intervals during application.

4. **Timing of fall application** will affect the amount and form of nitrogen in the soil. Fall application of liquid manure during colder conditions will result in higher amounts of nitrogen being available to the following crop. Cold conditions slow down microbial activity, resulting in a slowdown of the conversion of ammonium-N to nitrate-N. For solid manure, the opposite is true. Solid manure applied during early fall will maximize nitrogen available to the next crop since there is more time for soil microorganisms to work on converting the relatively high organic nitrogen portion of the manure.
5. **Injection of liquid manure** works best in dry soil conditions where macropores are disrupted and manure is fully incorporated throughout the full width of application. The least desirable situation is where high volumes of liquids lay in narrow bands closer to tile drains. Injection into wet soils will increase smearing, especially when combined with high, concentrated volumes being discharged from each injection point.
6. **Surface inlets** or hickenbottoms act as a direct conduit to surface water. In a wet year, the risk of water contaminated with manure moving through surface inlets increases. In a dry year it is easy to forget about this risk. Separation distances from hickenbottoms or inlets should be the same as for rivers or streams, unless it is certain that manure will be incorporated before the next rainfall event.
7. Liability issues are less likely in a dry fall, however **record keeping** of where manure was (or was not) applied is important for knowing where additional crop nutrients are required.

Winter Feeding Options From A Pasture Perspective

by Jack Kyle, Grazier Specialist, OMAFRA, Lindsay

As we approach the winter feeding season, it is an ideal time to be thinking about next year's pasture season. Even if the ground is frozen and covered with snow, there are things that you can do over the winter to improve pasture growth in the coming year.

The first step is to evaluate the condition of your pastures as the current grazing season draws to a close. Are there improvements and changes that you would like to make for the coming grazing season? How you organize and manage your livestock during the winter feeding period can have a big impact on next year's pasture.

Feeding Hay On Pasture To Improve Fertility

Is there a pasture that needs extra fertility to encourage grass growth? Feeding hay on this pasture field over the winter or part of the winter is a way to add this fertility. By moving the feeding site across the field you will increase the soil fertility of the field because of the manure that is deposited around the feeding area and any hay that is wasted. I have been in a number of pasture fields that received this type of treatment in the previous year or two. It is amazing how the grass thickens up from the increased nutrients and the grass seeds that are in the hay that was fed.

Always put the hay bale on fresh ground. If you are using a bale feeder then it will be necessary to move the feeder before each filling. With a feeder wagon, pull it to a new area every couple of days. A method that is used by some producers is to place the bales across the field and then use an electric wire to give livestock a few bales at a time. This has the advantage of placing all the bales at once, but the disadvantage of having to move an electric fence every few days while the livestock are in the field. You will be amazed at the impact these practices will have on improving grass production in the following years.

Graze Corn Stalks

Do you have the opportunity to use any crop residue for winter forage? If you have access to grain cornfields they can provide feed for several

months during the winter. Cows can winter quite successfully on corn stalks. They will glean any grain that has been missed by the combine and the leaves and stalks provide reasonable feed value. An electric wire will allow you to control the area that is grazed and make for an easy feeding system for part of the winter. Cows can graze through fluffy snow that is 8-12 inches deep.

Stockpile Grazing
Stockpile grazing refers to grazing the late-summer and fall growth in a field after the growing season ends. Cattle and sheep can successfully graze through several inches of fluffy snow. Select fields with firm soil conditions and a good accumulation of forage growth. Animals should be given access to only part of the pasture area at a time so that they consume most of the available forage, rather than picking out only the best. Fields that are stockpile grazed will be slightly slower to become productive in the spring. The savings gained by not having to harvest and store the forage will more than offset this loss of early spring growth.

There are a number of options that may fit your livestock operation that will help keep costs down and can be used to improve the productivity of your pastures. Consider your needs and opportunities and choose the ones that will work for you. For information on grazing corn stalks, stockpile grazing, and other pasture tips, refer to the OMAFRA Forage Website at www.gov.on.ca/OMAFRA/english/crops/field/forages.html.

What's In A Number

by Ian McDonald, Applied Research Co-ordinator, OMAFRA, Guelph

Numbers are everywhere, but what do they mean?

Everyone talks about averages - average rainfall, average temperature, average yield! Webster's dictionary defines "average" as "the result of dividing the sum of two or more quantities by the number of quantities summed". In other words, an average is essentially meaningless if the data used to calculate it is extreme.

Let's look at an example. Consider three situations which have the same average bu/ac yields:

A	90 + 100 + 110 = 300/3 = 100
B	50 + 100 + 150 = 300/3 = 100
C	0 + 100 + 200 = 300/3 = 100.

Although the best yield was recorded as 200 bu/ac in example C, which example do you think is more likely to give you more reliable average yield in the future? Example A is, because the variation between the individual numbers making up the average is "tighter". There is more likelihood that these differences are real and repeatable. By understanding the concept of variation, you are in a better position to interpret data and make the correct choices for your business.

When you are faced with averages of data from which you are trying to make decisions, insist on a measure of the variation that is present. This could include the raw data that makes up the averages, so you can see the amount of variation present. It could include the Coefficient of Variation (CV) for the test or the Least Significant Difference (LSD).

Coefficient of Variation (CV)
The CV describes the amount of variation in the data. The lower the CV value, the lower the underlying variation impacts the data. Values of less than 10% are best, but numbers up to 20 - 30% are likely acceptable, depending on the type of test.

Least Significant Difference (LSD)
The LSD is the amount of difference that has to occur between treatments for them to be assumed to be "statistically" different. The LSD determines if the differences between the average response of different treatments (ie hybrids, seeding rates, fertilizer rates) is due to the treatment or due to random chance that results from soil, climate, management or other variations across the trial site.

In the corn hybrid performance report, an LSD value is presented for each table. If the averages of two treatments differ by a value greater than the LSD, then they are considered significantly different from each other. LSD is a probability statistic measuring the potential for "chance" to occur. The LSD value is calculated in reference to some measure of chance, for example 0.05 (5%). This means that if the treatment means vary by more that the LSD value, then the difference can be considered significant with 95% confidence. In

other words, if the two treatments differ by more than the LSD value, there is only a 1 in 20 chance that this difference is mearly random, and not "real".

Consider % Differences, Not Necessarily Bushels

Another mistake we commonly make with numbers is comparing "apple to oranges", or in this case corn to soybean yield differences. We tend to get excited about a new management technique that yields a 10 bu/ac increase in corn, but scoff at a 2 bu/ac increase in soybeans.

Consider two extreme years, 2001 and 2006, for average corn and soybean yields (Table 1). In 2001, a 10% increase in provincial yield would have resulted in a 12.2 bu/ac increase. The same percentage increase in soybean yield would have been 2.1 bu/ac. If we consider the same 10% increase in productivity for both crops in 2006, the results would be 16.5 bu/ac for corn and 4.7 bu/ac for soybeans. This is because the starting points are so different between the crops.

Table 1 - Ontario Average Corn and Soybean Yields

	Ontario Average Yields (bu/ac)	
Year	**Corn**	**Soybean**
1998	129	40.9
1999	128	39.9
2000	105	37.0
2001	**102**	**21.1**
2002	113	33.9
2003	127	31.1
2004	131	40.7
2005	145	41.5
2006	**165**	**47.0**

When we compare the advancements in yield between crops we have to be sure we are considering the percentage increase occurring and not the number of bushels. Two bushels of increased soybean yield can be as significant as more than 10 bushels of corn. Keep things in perspective! Of course the economics of each new practice must always be considered as well.

Delving Into The Data

by Ian McDonald, Applied Research Co-ordinator, OMAFRA and Peter Johnson, Cereals Specialist, OMAFRA

Are you confused on how to interpret the data coming off of your corn and soybean strip plots? The challenging 2007 season often impacted field variation and your test plots. Big differences in variety response have been observed, but how real are they? If they are real, we want to be choosing those superior varieties. This interpretation can be very difficult if no check plots are present in the individual tests. But even when check plots are included, it can be confusing to determine performance differences between the entries.

Consider a standard strip trial setup (Figure 1). Checks included in typical strip trial plots help to determine the amount of field variation present at the site. Site variation is a "killer" to see the true treatment differences that may exist. In this trial, we want to determine if there are real differences in yield potential between the varieties. Site variation can hide these differences, or lead us to incorrect interpretations.

Figure 1. Typical Strip Trial Field Layout

Check	Entry	Entry	Entry	Entry	Check	Entry	Entry	Entry	Entry	Check
1	2	3	4	5	1	6	7	8	9	1
A					B					C

Table 1 describes some possible situations that you might face with yield data this season. All 4 examples have a check average yield of 130 bu/ac. If we consider that a 10% variation from average of individual check yields is acceptable, then the range of check yields that would be acceptable is 117 to 143 bu/ac. If the check yields are within this range we will consider the differences between variety entries to be real.

Acceptable Field Variation

In Examples 1 and 2, all the check plots are within the 10% range and we have confidence that the field variation is minimal. We can use this plot data to choose varieties for next season.

Table 1. Example Yield Scenarios From Strip Trial Checks

Example #	Check Yields (bu/ac)			Average[1]	Range[2]
	Check 1 A	Check 1 B	Check 1 C		
1	132	130	128	130	117 to 143
2	123	131	137		
3	120	158	111		
4	100	128	161		

[1] Calcualtion of Check Averages = Check1A+1B+1C÷3

[2]Calculation of range around average yield: 130*0.9=117 and 130*1.1=143

Unacceptable Field Variation

Examples 3 and 4 highlight many of the situations occurring in 2007. The variation between checks is much greater than 10% of the check average. This suggests that other field related effects are having a significant impact on yield performance. These effects could be related to soil differences, including texture, drainage, compaction, etc. Past differences in tillage, fertilizer use, previous crop, weed pressure and other management practices could also be involved. In many cases in 2007 these field effects resulted in different parts of the same field having different availability to moisture.

Using plot data for choosing the best variety in these situations is nearly impossible. The only option left is to split the trial in two, using the central check plot and each outside check plot to determine an average for ½ the trial. If the individual two checks fall within 10% variation from the average of the two checks, you can consider comparing the varieties between these two checks. Even this does not work in examples 3 and 4. The variation in the individual checks from the average of the two checks is still greater than 10% (ie example 4 check 1A+1B= 100+128÷2=114 for a 10% range of 114+/- 10% = 102.6 to 125.4).

Examples 3 and 4 show trials that should not be used for making decisions on variety selection. Unfortunately, these trials are a lot of good intentions and effort that end up being wasted.

Multiple Site Locations Required

Seed companies try to account for field variation by conducting numerous trials across the province, over a wide variety of locations. These trials primarily support the environmental adaptability of cultivars to a wide range of soil, climate and management effects. Previous studies have shown that a minimum of 30 site comparisons between varieties is required to offset the impact of field variation. Many of these strip tests are conducted without internal checks as described above. These trials must not be used alone in making variety decisions!

Brown Root Rot of Alfalfa in Ontario!

by Albert Tenuta, Field Crop Plant Pathologist, OMAFRA, Ridgetown

"Winter kill" is always a concern at this time of year and 2007 preliminary data suggests brown root rot disease of alfalfa is a new winter kill risk factor for Ontario and needs to be considered when evaluating stands. Brown root rot is not a new disease to Canada and has been present in western Canada since the 1930s. Since 2003, the disease has been confirmed in the many of our neighbouring U.S. great lakes states and the northeast (Minnesota, Wisconsin, New York, Vermont and New Hampshire) and is very likely widespread in the region.

Was this the case in Ontario as well? To answer this question a small survey was conducted in 2007 with the assistance of Michael Wunsch (graduate research assistant) and Dr. Gary Bergstrom (Professor) in the Department of Plant Pathology at Cornell University in Ithaca, New York. We would like to thank both Michael and Gary for including the Ontario alfalfa samples into their brown root rot northeastern US survey.

This summer 10 alfalfa field samples were collected in Ontario starting in the Woodstock/ Niagara region to the Ottawa region in the east. These samples were sent to Cornell for processing

and identification. Of the 10 samples processed, the brown root rot pathogen (*Phoma sclerotioides*) was detected in 7 or 70 % of the fields. How much BRR was found in these positive fields (incidence) varied from 5% (very low) to 30% (moderate-high) of the roots and/or crowns being infected. Although these results are preliminary they could further support the US data suggesting the disease is widespread in alfalfa production systems in the region but went undiagnosed. The next step is confirmation by molecular techniques of these preliminary results.

What to Look For? As mentioned, brown root rot is caused by the fungal pathogen *Phoma sclerotioides* which thrives when soil temperatures are 15 °C or less and hence, the fungus is most active in the fall and spring when environmental conditions are favourable for infection and the plants are dormant. Infection of the roots and/or crowns can have a detrimental impact on over-wintering health and promote other diseases, winter kill, stand decline and yield loss. Since the fungus also grows very slowly damage is not often noticed until the second or third year when plants become stunted or die. The tap roots, lateral roots and/or crown have characteristic sunken brown lesions (almost black) and in severe cases the tap root is rotted completely. The fungus does not infect the above ground parts of the alfalfa plant.

Since the availability of resistant varieties for Ontario is limited other management strategies such as avoiding late or excessive fall harvest (reduce plant stress going into winter), maintain proper soil fertility and rotating out of alfalfa for at least three years can help reduce losses and increase stand longevity.

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Figure 1 - Three-year-old alfalfa plant showing severe rot of the tap and secondary roots caused by brown root rot. Note the dark brown to black discoloration of the lower plant crown and upper root. Photo and description courtesy of University of Wyoming.

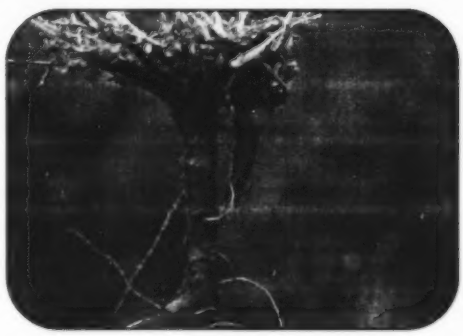

Figure 2 - Three-year-old plants affected by brown root rot. The plant on the right is dead with the tap root completely rotted, while the plant on the left has a dark brown girdling lesion on the root and was slow to produce spring growth. Photo and description courtesy of University of Wyoming.